NOAA Climate Test Bed
Response to SAB Recommendations (FY07)

September 2006

1.0 Introduction

The 2nd NOAA Climate Test Bed (CTB) Science Advisory Board (SAB) Meeting was held June 28-29, 2006 at the Hilton Silver Spring, in Silver Spring, MD. The meeting was intended to bring together the CTB staff and the SAB to review CTB FY06 progress, and to gather independent expert advice from the SAB on short-term (FY07-FY08) and long-term (next 5 years and beyond) science priorities.

The SAB meeting began with a closed Executive Session, followed by focused discussions on CTB science priorities, implementation strategy, technology transfer, and management and operations planning. Transition Project Team (TPT) chairs provided briefings on FY07 scientific projects, including CFS improvements, tool consolidation, and improvements to climate forecast products. The complete agenda for the meeting is given as Appendix B. See the CTB web site for the presentations:

http://www.cpc.ncep.noaa.gov/products/ctb/2nd.SAB.Meeting.shtml

Prior to the meeting, the CTB requested feedback from the SAB on the following questions:

Science Priorities

- Does the CTB have a credible science plan and implementation strategy?
- Does the CTB implementation strategy link science priorities and resources?
- What is the appropriate balance between CFS improvements and multi-model ensemble efforts?

Community Involvement

- Are collaborations and partnerships with organizations outside NCEP developing properly?
- What is the appropriate partition between in-house transition work and external research?
- Do CTB human and computational resources meet community needs?

Computing and Data Access

- Does the CTB Data Policy meet the needs of the community?
- Does the CTB have effective hardware and software tools for disseminating products?
- What has been the most important research or development result that has been transferred to operations? customers?

SAB Structure and Meetings

- How often should the SAB meet and why? What about the OB?
- How should CTB meetings be increased (SAB meeting; workshop sessions; PI meetings)?
- Does the SAB recommend any changes to its membership?

Following the meeting the SAB provided the CTB management with written feedback on these and other issues in the form of a set of recommendations. The CTB has carefully considered this advice. In the following report we restate the SAB recommendations (extracted from the June 2006 Report), followed by what actions will be taken, which will not, and why.

The CTB management wishes to take this opportunity to thank the SAB for their active participation, open communication and terrific advice. The SAB recommendations have already made a significant difference in the future direction of the CTB.

2.0 SAB Recommendations and CTB Actions

The SAB recommendations (numbered in bold) and CTB actions follow. The SAB recommendations were extracted from the SAB written report (see Appendix A). The CTB report is organized according to the 4 categories of questions listed in section 1.0. The CTB Management Team, CTB Transition Project Teams, the Climate Science Team, and the Oversight Board will implement these recommendations as indicated below.

2.1 Science Priorities

The CTB agrees that a more detailed and coordinated science and implementation plan is needed, and that a realistic prioritization of science priorities would help. The CTB also agrees that it is appropriate to elevate the multi-model ensemble (MME) effort to the highest priority. The MME effort will include both national and international collaboration, with an attendant increase of resources allocated to the MME effort. Specific SAB recommendations and CTB actions are as follows:

1) That the CTB develop more detailed and coordinated science and implementation plans, enumerating the "how", the "why", and identifying the constraints and the trade space the CTB is working within.

CTB agrees that a more detailed and coordinated Science Plan and Implementation Strategy (SP&IS) is needed. A revised SP&IS will be provided to the SAB prior to its next meeting with details on our strategy. .

2) That CTB science and implementation plans should be vetted within the CTB organization, its partners, and the SAB.

The CTB mgmt will vet its plans with CTB personnel, the OB, the CST and the SAB to ensure that CTB science is not conducted in an ad-hoc manner. CTB implementation plans will include the project management structure, specific outputs (milestones, deliverables), and a description of how they support the overall CTB goals.

3) That CTB elevate a multi-model ensemble (MME) effort to the highest priority.

The CTB agrees to elevate MME as its top science priority. The CTB will sponsor the MME project to demonstrate the value added by composing the MME. Both EMC and CTB will carry out the development and technical evaluation of the prototype MME. CPC and CTB will evaluate the prototype and final products when they are candidates for operational implementation. A "White Paper" that details the MME Implementation Strategy (including specific activities, timeline and milestones) will be sent to the SAB, posted on the CTB website, and updated periodically

4) That CTB should have an FY08 milestone for having in place at least a four-model multi-model ensemble using equal weighting of the CFS, GFDL, GMAO, and NCAR models.

The CTB is aggressively pursuing an MME implementation strategy consistent with SAB recommendations. This strategy will be vetted with the CTB staff, and incorporated into the revised SP&IS. EMC-CTB-CPC are pursuing both international collaborations (with EURO-SIP and APCC), and national collaborations (with GFDL, NASA, NCAR). Because the international collaboration involves operational models (with existing hindcast datasets), it is seen as a near-term activity. Thus, the FY08 milestone recommended by the SAB may involve models other than those suggested by the SAB. CTB resources allocated to the MME effort will be enhanced (including FTE's).

5) That forecast skill metrics be used or developed that are more appropriate for managers' and users' of climate-related risk management needs than the Heidke score.

The CTB agrees that this is an important issue. The NOAA Climate Predictions and Projections Program has taken the lead on improving metrics for climate prediction (e.g. the Climate Predictive Index (or CPI), which includes sub-seasonal, seasonal and decadal components). Appendix E of the CTB Science and Implementation Plan defines the CPI and describes how it rectifies shortcomings in the current performance measure (Heidke skill score for US seasonal temperature):

http://www.cpc.ncep.noaa.gov/products/ctb/CTB-Science-Plan-Mar06.pdf

The CPI may not be appropriate for specific user communites (such as the climate risk community). Additional resources, beyond those currently available, are required to work with these communities in developing user appropriate metrics.

2.2 Enhancing Scientific Community Involvement

The CTB agrees that a close working relationship between the CTB and the scientific community outside NCEP is essential for achieving the CTB goal of accelerating the transfer of research results to operations. CTB will expand efforts to increase the current level of collaboration with the outside community to achieve the goal of improving NCEP's climate forecasting capabilities. CTB will take these actions, as part of the overall recommendation to make a concerted effort in Multi-Model Ensemble (MME) prediction, to more effectively leverage outside resources to

support NCEP's forecasting mission. Specific SAB recommendations and CTB actions are as follows:

1) That the allocation of existing resources (AO) be modified as soon as possible to support the recommended priority in MME forecasting.

CTB agrees with the SAB recommendation and will work with NCPO on the focus of the FY08 AO.

2) That the CTB take more aggressive steps to engage and leverage activities funded by other agencies.

CTB agrees to aggressively enhance outreach to leverage activities funded by other agencies (e.g. NASA), programs (e.g. CLIVAR Climate Process Teams) and NOAA AOs (e.g. CPPA, CVP).

3) That the CTB take leadership in developing an interagency initiative to create a Joint MME Experimentation Facility.

CTB agrees to take leadership in developing an MME initiative, including an interagency national activity (potentially involving forecast systems at NCEP, GFDL, NASA, and NCAR/COLA) and an international activity (potentially involving operational models from EURO-SIP and APCC).

4) That the CTB adopt a two-step approach to the implementation of MME forecasting: An experimental collaborative project, followed by a deliberate transition to operations.

CTB agrees to the two-step approach. The CTB will sponsor the MME project to demonstrate the value added by composing the MME. Both EMC and CTB will carry out the development and technical evaluation of the prototype MME. CPC and CTB will evaluate the prototype and final products when they are candidates for operational implementation. Since there has been relatively little work to date on the advantages of less stringent requirements for MME, CTB plans to make use of the hindcast data from the DEMETER project and the CFS to study the potential for a less-stringent requirement. Since the hindcasts for DEMETER and the CFS have already been completed, this work will shed light on the need for a full hindcast data set from the other MME members

In that regard, the CTB Climate Science Team held a teleconference on 19 July 2006 to begin a dialogue on the scientific issues regarding a simplified MME approach. The basic results from that telecon highlighted the importance of initial screening and bias correction of the models in any simplified approach. There was also unanimous support for a one-day MME workshop to further address the science of MME methods, and to get more information about the lessons learned from existing national and international MME efforts.

5) That the CTB provide the SAB with details on the allocation of CTB resources for the development of decision support tools, which currently uses the largest number of FTEs.

CTB agrees to provide the SAB a detailed description of Transition Project Team (TPT) activities (including those related to decision support) as well as the number of FTE's involved, specific projects, milestones and expected outcomes in advance of its next meeting. Since the June meeting the CTB has decreased the number of TPTs from 6 to 3. The new TPT's are (i) Climate Modeling Team, (ii) Multi-Model Ensemble Team and (iii) Climate Forecast Products Team. Sub-groups have been organized and are currently operating within the TPTs. MME is now the top science priority, so some reallocation of FTE's to the MME TPT is anticipated in FY07.

6) That the CTB provide feedback on information (e.g. data and products) that intermediaries (e.g. RISA's, RCC's) would like to see.

CTB agrees to aggressively pursue outreach activities with RISA's, RCC's and other intermediaries. As a recent example of CTB commitment and responsiveness to this, the CTB provided quick turnaround to a RISA "wish list" shortly after the SAB meeting. This feedback outlined specific actions that were deemed relatively painless, moderately difficult, and requiring careful thought (our detailed response is available upon request). The CTB has also stepped up participation in RISA PI meetings and workshops organized by NWS/Climate Services Division (including the CPAS Workshops)

2.3 Computing and Data Access

The Climate Test Bed (CTB) will continue to address major challenges in the area of computing and data access, some of which require considerable planning. Some specific SAB recommendations and CTB actions are as follows:

1) That CTB develop a coherent strategy for the allocation, monitoring, administration and evaluation of the shared computing facility.

The CTB will take the following specific actions:

- Consult with the NCEP Computing Oversight Board (Lord (Chair), Laver, Toepfer, Cooley) on internal computer resource matters;
- Consult with NOAA CIO Office on management of the CTB portion of the new NOAA R&D computer;
- Request that the NCEP Computing Oversight Board (Lord, Laver, Toepfer, Cooley) consult with external experts (e.g. CSL and SCD/NCAR) on the strategy for allocation and monitoring of CTB computer resources;
- Work with the CST Co-Chairs to gather and evaluate quarterly progress reports from the Transition Project Teams on computer usage tied to CTB projects;
- Vet and document any recommended improvements in the CTB strategy for the shared computing facility.

2) That the CTB give a high priority to adding the GODAS data sets to those already being distributed.

The CTB will continue to work closely with the GODAS team to ensure that GODAS data sets are distributed. This includes additional improvements to the GODAS website:

http://www.cpc.ncep.noaa.gov/products/GODAS/

3) That the CTB review the needs of the stakeholder and applications communities to determine if the data policy adequately addresses those needs.

The CTB will continue to work with the stakeholder and applications communities to ensure that its data policy meets the needs of a diverse user community.

4) That the CTB provide a list of results that have been transferred to operations in future reports.

The CTB will provide a list of results that have been transferred to operations.

2.4 SAB Structure and Meetings

1) That the CTB focus future SAB meetings on scientific issues facing the CTB

The CTB agrees to focus future SAB meetings on scientific issues. At the next SAB meeting at least one-half day will be focused on the scientific strategy and accomplishments of the CTB MME priority. There will also be a presentation outlining and justifying the science priorities and selection process of internal transition projects. This will be coordinated with Transition Project Team presentations to more clearly define the science issues being addressed in the context of the broader CTB goals.

2) That the Oversight Board (OB) be more engaged in the oversight of the CTB as a whole.

The CTB will work with the OB to reconsider its Terms of Reference.

3) That the CTB have a separate annual Climate Science Team / Transition Project Team meeting involving all internal and external scientists supporting the CTB.

The CTB Deputy Directors for Administration and Transition to Operations will take the lead on organizing this meeting. They will work with the CST Co-Chairs, TPTs, OB and SAB to organize the meeting. This meeting may be coordinated with future SAB meetings.

4) That communication and interaction between the CTB and the SAB be enhanced regarding the science priorities and SAB recommendations.

The CTB will provide a response to current (and future) SAB recommendations. The response will include what actions will be taken, which will not be, and for what reasons.

The CTB also agrees to provide interim progress reports on CTB actions. The CTB agrees to provide the next report in early 2007 prior to the scheduling of the next SAB meeting. The CTB will allow the SAB to determine the agenda and timing of the SAB meeting based on a list of issues provided by the CTB in advance of future CTB meetings. The CTB will provide the SAB with appropriate access to CTB presentations at future meetings (e.g. CDPW; CPAS).